



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,207	03/14/2006	Shigeru Kasai	033082M244	7732

441	7590	12/20/2007
SMITH, GAMBRELL & RUSSELL		
1130 CONNECTICUT AVENUE, N.W., SUITE 1130		
WASHINGTON, DC 20036		

EXAMINER	
CHANDRA, SATISH	

ART UNIT	PAPER NUMBER
1792	

MAIL DATE	DELIVERY MODE
12/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/525,207

Applicant(s)

KASAI ET AL.

Examiner

Satish Chandra

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 44 is/are pending in the application.
- 4a) Of the above claim(s) 8 - 44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 1/06, 4/07, 10/07.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election of Species 1 (Claims 1 – 7) in the reply filed on 10/05/2007 is acknowledged.

Claim Objections

Claim 7 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim 7 depends on claim 4 which is also a multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claim 7/4 is not been further treated on the merits.

Drawings

The drawings are objected to because Fig 12 shows air but does not specify how it is provided. Claimed subject matter is not shown in Fig 12 whereas Fig 14 clearly shows a hole that provides air. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after

Art Unit: 1763

the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4 – 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ganguli et al (US 6,772,072) in view of Kim (US 6,424,800).

Ganguli et al disclose:

A gas supply system for supplying a specific gas (Fig 1) into the processing chamber 110 wherein the said material gas is produced from solid precursor 122 via a gas passage (not labeled) extending to the processing chamber, a material reservoir tank 124 attached to one end of the gas passage for containing the solid precursor, a first carrier gas supply means connected to the said material reservoir tank into which carrier gas is fed.

Ganguli et al do not disclose:

Art Unit: 1763

Regarding claim 1, a gas diffusion chamber provided in the bottom portion of the said material reservoir tank and a gas injection plate separating the said gas diffusion chamber and having a number of gas injection holes.

Regarding claims 4 and 5, a heating means is provided in the bottom portion of the said material reservoir tank

Regarding claim 6, the said material heating means is implanted in the said gas injection plate.

Kim discloses:

Regarding claim 1, a bubbler for supplying solid precursor by admitting gas into the bottom portion of the container (Figs 4, 5) comprising a porous gas injection plate 48, 58 through which the gas diffuses in the container and sublimates or liquefies the solid precursor.

Regarding claims 4 – 6, a heater source 73 (Figs 5 – 7) is installed parallel to and facing the plate 58 (Column 4, lines 12 – 13). The heater source can be positioned a predetermined distance apart from the plate 58. Alternatively, the heater source 73 (Column 4, lines 60 – 61) can be embedded in the porous plate 58a (Fig 9).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a gas diffusion chamber in the bottom portion of the material reservoir tank and a porous gas injection plate separating the said gas diffusion chamber in the apparatus of Ganguli et al as taught by Kim

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a heater source in the bottom of the bottom reservoir tank or imbedded in the porous plate in the apparatus of Ganguli et al as taught by Kim.

The motivation for providing a gas diffusion chamber in the bottom portion of the material reservoir tank and a porous gas injection plate separating the said gas diffusion chamber in the apparatus of Ganguli et al is to uniformly introduce carrier gas in the solid metal container as taught by Kaoru et al.

The motivation for providing a heater source in the bottom of the bottom reservoir tank or imbedded in the porous plate in the apparatus of Ganguli et al is to heat the solid precursor.

Claims 2, 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ganguli et al (US 6,772,072) in view of Kim (US 6,424,800) as discussed in claims 1, 4 – 6 above and further in view of Guenther (US 2004/0025370).

Ganguli et al and Kim do not disclose if the porous plate (gas injection plate) is made of fluorinated resin.

Guenther discloses: a method and apparatus for generating gas to a processing chamber wherein a first filter (gas injection plate) 222 (Fig 2) is disposed inside the canister 100 (Para 0035) proximate the first end 212 to prevent the solids 216 from passing out of the first end 212 of the canister 100. Guenther further discloses (Para 0036) that the filters 222, 223 may be fabricated from fluoropolymers, PFA, PTFE and the like.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide porous plate (gas injection plate) made of fluorinated resin or coated with fluorinated resin in the apparatus of Ganguli et al and Kim.

The motivation for providing porous plate (gas injection plate) made of fluorinated resin or coated with fluorinated resin in the apparatus of Ganguli et al and Kim is to provide a porous plate made of material to withstand the gas atmosphere of the bubbler.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ganguli et al (US 6,772,072) in view of Kaoru et al (JP 02-124796).

Ganguli et al disclose:

A gas supply system for supplying a specific gas (Fig 1) into the processing chamber 110 wherein the said material gas is produced from solid precursor 122 via a gas passage (not labeled) extending to the processing chamber, a material reservoir tank 124 attached to one end of the gas passage for containing the solid precursor, a first carrier gas supply means connected to the said material reservoir tank into which carrier gas is fed.

Ganguli et al do not disclose:

A gas diffusion chamber provided in the bottom portion of the said material reservoir tank and a gas injection plate separating the said gas diffusion chamber and having a number of gas injection holes.

Kaoru et al disclose:

Art Unit: 1763

A device for supplying solid organic metal by admitting gas into the bottom portion of the container comprising a gas injection plate through which the gas diffuses in the container and sublimates the organic metal (Abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a gas diffusion chamber in the bottom portion of the material reservoir tank and a gas injection plate separating the said gas diffusion chamber and having a number of gas injection holes in the apparatus of Ganguli et al as taught by Kaoru et al.

The motivation for providing a gas diffusion chamber in the bottom portion of the material reservoir tank and a gas injection plate separating the said gas diffusion chamber and having a number of gas injection holes in the apparatus of Ganguli et al is to uniformly introduce carrier gas in the solid metal container as taught by Kaoru et al.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ganguli et al (US 6,772,072) in view of Kaoru et al (JP 02-124796) as discussed above in claim 1 and further in view of Wong et al (US 5,891,253).

Ganguli et al and Kaoru et al do not disclose: a porous fluorinated resin layer is provided on the gas injection surface.

Wong et al disclose:

A coating is provided to protect the component against corrosion, it is important (Column 5, lines 26 – 36) to obtain a uniform and complete coverage of the component with the corrosion-resistant coating.

Art Unit: 1763

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a coating on the chamber components such as gas injection surface in the apparatus of Ganguli et al and Kaoru et al.

The motivation for providing a coating on the chamber components such as gas injection surface in the apparatus of Ganguli et al and Kaoru et al is to protect the gas injection plate from corrosion as taught by Wong et al.

Ganguli et al, Kaoru et al and Wong et al do not disclose: if the coating is of porous fluorinated material.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a coating of porous fluorinated material on the chamber components such as gas injection surface in the apparatus of Ganguli et al, Kaoru et al and Wong et al.

The motivation for providing a coating of porous fluorinated material on the chamber components such as gas injection surface in the apparatus of Ganguli et al, Kaoru et al and Wong et al is to provide a coating of alternate and equivalent coating material. Further it has been held, the selection of a known material based on its suitability for its intended use is prima facie obviousness. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945). Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig-saw puzzle. 325 U.S. at 335, 65 USPQ at 301.

Art Unit: 1763

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ganguli et al (US 6,772,072) in view of Kaoru et al (JP 02-124796) and Wong et al (US 5,891,253) as discussed in claim 2 above and further in view of Williams (US 5,614,026).

Ganguli et al, Kaoru et al and Wong et al do not disclose: the gas injection plate is made of porous fluorinated resin.

Williams discloses: a showerhead is preferably made of an electrically non-conductive material, such as quartz and can be made of any suitable material such as aluminum, silicon etc.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the gas injection plate of any suitable material such as porous fluorinated resin in the apparatus of Ganguli et al, Kaoru et al and Wong et al.

The motivation for making the gas injection plate of any suitable material such as porous fluorinated resin in the apparatus of Ganguli et al, Kaoru et al and Wong et al is to make the showerhead of any suitable material. Further it has been held, the selection of a known material based on its suitability for its intended use is prima facie obviousness. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945). Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig-saw puzzle. 325 U.S. at 335, 65 USPQ at 301.

Art Unit: 1763

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ganguli et al (US 6,772,072) in view of Kaoru et al (JP 02-124796) as discussed in claim 1 above and further in view of Hatano (US 5,989,345).

Ganguli et al, Kaoru et al do not disclose: a heating means provided at the bottom to heat the precursor material.

Hatano discloses: a heating means 28 (fig 1) at the bottom of the container 22 for heating the precursor material TiCl_4 .

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a heating means at the bottom of the material container tank in the apparatus of Ganguli et al, Kaoru et al as taught by Hatano.

The motivation for providing a heating means at the bottom of the material container tank in the apparatus of Ganguli et al, Kaoru et al is to sublime the material by heating it.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ganguli et al (US 6,772,072) in view of Kaoru et al (JP 02-124796) and Hatano (US 5,989,345) as discussed in claims 4 and 5 above and further in view of Sandhu et al (US 6,499,425).

Ganguli et al, Kaoru et al, Hatano do not disclose: a heating means is implanted in the said gas injection plate.

Sandhu et al disclose:

A heating element 222 (Fig 11, Column 11, lines 50 – 54) internal to the perimeter 342 of the showerhead 210 could be used to ionize one or all of the gases.

Art Unit: 1763

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implant a heater in the gas injection plate of Ganguli et al, Kaoru et al, Hatano as taught by Sandhu et al.

The motivation for implanting a heating element in the gas injection plate of Ganguli et al, Kaoru et al, Hatano is to heat the showerhead for heating or ionizing the gases.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ganguli et al (US 6,772,072) in view of Kaoru et al (JP 02-124796) in view of Ushigoe et al (JP 05-009740)

Kaoru et al were discussed above and disclose the gas injection plate is somehow supported inside the material container.

Ganguli et al and Kaoru et al do not disclose: the shower portion of the gas injection plate is supported by support members on said bottom portion, each of the support members having a hollow portion inside and each of the said hollow portion provides atmospheric air.

Ushigoe et al disclose: electrodes 8A and 8B (Figs 1, 2) enclosed in a hollow tubular pieces 11A and 11B (cylindrical objects) wherein the space around the electrodes is surrounded by air.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide supporting members (retainers, posts) for supporting the gas distribution plate in the apparatus of Ganguli et al and Kaoru et al as taught by Ushigoe et al.

Art Unit: 1763

The motivation for providing retainers in the apparatus of Ganguli et al and Kaoru et al is to provide an alternate and equivalent supporting means for supporting gas distribution plate in the apparatus of Ganguli et al and Kaoru et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Satish Chandra whose telephone number is 571-272-3769. The examiner can normally be reached on 8 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, Primary Examiner, Jeffrie R. Lund can be reached on 571-272-1437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Satish Chandra



Jeffrie R. Lund
Primary Examiner

Application/Control Number: 10/525,207

Page 13

Art Unit: 1763

SC

10/21/2007